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Relation between Serum Magnesium Level and Severity and Frequency of Migraine Headache Attacks

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ABSTRACT

The aim of this study was to assesses the relation between Serum Magnesium Level and Severity and Frequency of Migraine Headache Attacks. The study was performed on 100 patients those were divided randomly into two groups (Migraine patients and healthy patients each with 50 cases). For the first group (migraine patients) in addition to the usual migraine medication, magnesium oxide pills were prescribed and for healthy patients placebo was administered. Changes in the serum magnesium levels, severity and frequency of migraine headache attacks, one and three months after the start of the study were evaluated and collected data analyzed by statistical methods in SPSS.16. In migraine patients, 26% and in healthy patients, 30% were male and rests of them were female. All patients were aged 18-65 years. At one month and three months after intervention, the mean serum magnesium levels and headache severity was similar between two groups. One month later, reducing the number of headache attacks in the migraine patient was similar to the healthy patients but three months later, there was significant difference between two groups. (P= 0.004). Results showed that administration of magnesium can reduce the number of migraine attacks and can be more effective in preventing of disease.

INTRODUCTION

Headache is a common disease and occurs in allages. Chronic headaches are usually benign, although each acute attack may be highly debilitating. Of evaluated headaches in the emergency and clinic, about 38% and 44% are migraine headache, respectively. The prevalence of migraine headache in women was 3-18% and in men was 4-6 % (Aminoff *et al.*, 2009; Talebi *et al.*, 2011). Migraine appears often as one-sided pulsating chronic headache and usually accompanied by nausea, vomiting, photophobia, and a feeling of fatigue. Sometimes migraine headache is severe and disrupts the patient's daily activities. Treatment of migraine often requires long-term use of drug, so majority of patients, as well as pregnant women and people with heart disease shun long-term and regular use of medications. In more than20% of patients in addition to headaches, symptoms of mood, appetite and cognitive is created. Most of patients are with a family history of migraine (Aminoff *et al.*, 2009). Some probable mechanisms have been described to the relationship between magnesium (Mg) level and migraine headache attacks (Samaie *et al.*, 2012). Previous studies on migraine have shown various results in relation between level of magnesium and incidence of migraine attacks (Welch and Tayi, 2006; Masoud, 2003). Due to the high prevalence of migraine, complications and effective symptoms on patient quality of life, limitations on the use of appropriate treatment and the need to prevent attacks of the disease, doing research on this disease is essential. This study aimed to determine the effect of magnesium level on severity and frequency of migraine attacks in patients.

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METHODS

This clinical trial study has been done on 100 referred patients to hospital with headache which have inclusion criteria and completed the consent form before study. All patients divided randomly in two groups each with 50 patients and the Valproate sodium, Propranolol, Ibuprofen or Gelofen tablets prescribed for all patients. In addition to routinely drugs, patients in case group received Magnesium oxide tablets (250 mg/ 12 h) by orally and patients in control group received placebo. All patients were advised to take their medication regularly and follow migraine elimination diet.

Assessment of the severity and number of migraine attacks was measured for all patients in three visits (on admission, one month later and three months later) by clinical examination in the neurology clinic by neurologist. Also the level of magnesium measured for all patients in three times. For the measurement of magnesium in laboratory, 5 ml of blood sample was taken from each patient and put in the centrifuge at 1500 rpm for 15 minutes. After separation serum, magnesium concentration was measured by colorimetric by auto analyzer**.**Collected data analyzed by statistical methods in SPSS.16. The $p<0.05$ was considered as significant. The study design was approved by Ardabil University of Medical Sciences ethical committee.

RESULTS

Of all patients 32% were male and rest of them was female. The age range of patients was 18-65 and most of them were in age groups 30-44 with 56%.Maximum duration of illness in 33% of patients was 1 to 4 years. 53% of patients have Migraine with aura and 47% without aura. In first referral in case group 25 (50%) have 7-10attacks in month and in control group 25(50%) 4-6 attacks in month and the difference between two group was significant.

Table 1: Number of attacks by two groups in all visits.

Group	Visit	Number attacks	N(%)	p-value
Baseline	Case	1-3	9(18)	0.045
		4-6	16(32)	
		7-10	25(50)	
	Control	1-3	12(24)	
		4-6	25(50)	
		7-10	13(26)	
One month later	Case	26(52)	1-3	0.89
		21(42)	4-6	
		3(6)	7-10	
	Control	24(48)	1-3	
		23(46)	4-6	
		3(6)	7-10	
Three month later	Case	1-3	37(74)	0.004
		4-6	12(24)	
		7-10	1(2)	
	Control	1-3	22(44)	
		4-6	28(56)	
		7-10	2(4)	

The number of headache attacks in one and three month after magnesium administration evaluated and compared between two groups. Results showed that there wasn't significant difference between two groups after one month but third visit (after three month) the number of attacks in case group was lowers than control group (p=0.004) (Table 1).

Changing the severity of headache attacks is one of the criteria which evaluated in all three time visits. In first visit in case and control groups 39 (78%) and 32 (64%) have severe headache which was statistically significant between two groups. The rate of severity headache decreased between two groups after follow-up time but there weren't statistically significant differences between two groups in second and third visits (Table 2).

Table 2: Severity of attacks by two groups in all visits.

Group	Visit	Number attacks	N(%)	p-value
Baseline	Case	Mild	0	0.1
		Moderate	11(22)	
		Severe	39(78)	
	Control	Mild	0	
		Moderate	18(36)	
		Severe	32(64)	
One month later	Case	Mild	7(14)	0.15
		Moderate	30(60)	
		Severe	13(26)	
	Control	Mild	6(12)	
		Moderate	24(18)	
		Severe	20(40)	
Three month later	Case	Mild	19(38)	0.17
		Moderate	22(44)	
		Severe	9(18)	
	Control	Mild	12(24)	
		Moderate	27(54)	
		Severe	11(22)	

The level of magnesium in first visit was similar between two groups each with 1.9 mg/dl. All of patients observed the national migraine diet and proper use of common migraine drugs and magnesium oxide in follow-up time. Also, all patients checked in terms of specific diseases which in case group 8(16%) and control group 4(8%) have cold. The mean of magnesium after three month increase in case group to 2.208 and in control group to 1.922 from baseline, but this rising no statistically significant between and whiten two groups. (Figure 1)

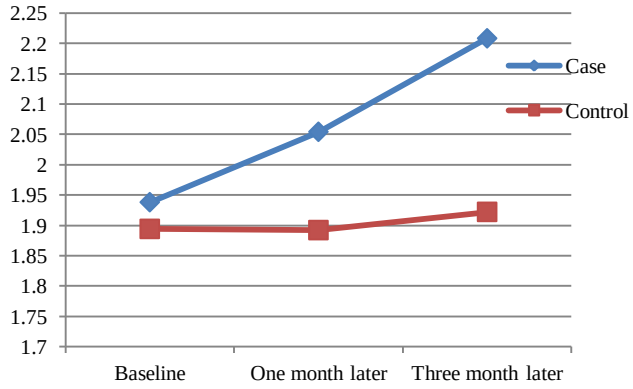

Fig. 1: Mean of serum magnesium in patients of two groups during follow-up time.

DISCUSSION

In this study rate of headache attacks three month after drug administration in case group significantly decreased compare to control group. (p=0.004). In a study (Welch and Tayi, 2006) found that decreasing magnesium cause to decreasing Physiological threshold and increasing number of headache attacks and increasing magnesium cause to decreasing attacks of migraine headache. Masoud *et al* in a study showed that incidence number of attacks hasn't significant relation with mean of serum magnesium (Masoud, 2003). In a study done by Roodbari and Abrishamizadeh (2008) results showed that increasing serum magnesium in patients deal to decreasing the number of headache attacks in patients. In another study the role of low level serum magnesium in incidence of migraine attacks and conversely was proven (Qujeq *et al*., 2009).

In this study there weren't significant differences in serum magnesium level between two groups in baseline and during follow-up time. Some of studies confirmed this result such as Mauskop (2008) and Nouri (2007) and some studies not similar to this study (Aloidisil, 2007; Kelon, 2010). Samaie *et al* (2012) in a study showed that Serum Mg level is on average significantly reduced in patients with migraine compared to the healthy group. Also showed that the serumtotal Mg levels in migraineurs remained constant within and between migraine headache attacks. Roodbari and et al in a study was proved that increasing serum magnesium levels can help sedation the severity of migraine in 20% of patients which was consistent with the results of our study (Roodbari and Abrishamizadeh, 2008).

CONCLUSION

Results of this study showed that administration of magnesium pill in patients with migraine headache couldn't significantly reduce the severity of headache but was able to reduce the number of migraines and effective to prevent it.

Conflict of Interest: none-declared

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